

CLAIMS:

1. A belt tension indicator for indicating tension in a belt from a child safety seat to an anchorage, the indicator comprising:

- a housing accommodating an end of the belt;
- anchorage means extending from within the housing for securing the end of the belt to the anchorage;
- an at least partially resilient connection of the belt in the housing to the securing means, the connection allowing resilient withdrawal of the belt from the housing at least to a predetermined tension associated with correct installation of the belt;
- an indicator for indicating that the predetermined tension in the belt has been reached;

the resilient connection being adapted to allow further withdrawal of the belt at higher tension such as to limit deceleration of an occupant of the seat in an accident.

15 2. A belt tension indicator as claimed in claim 1, wherein the resilient connection is adapted to allow the further withdrawal in a resilient manner.

3. A belt tension indicator as claimed in claim 2, wherein the resilient connection is adapted to allow the further withdrawal at the same spring rate as that to the resilient withdrawal to the predetermined tension.

20 4. A belt tension indicator as claimed in claim 3, wherein the resilient connection includes a single spring providing the resiliency to the predetermined tension and beyond.

5. A belt tension indicator as claimed in claim 2, wherein the resilient connection is adapted to allow the further withdrawal at a higher spring rate than that to the resilient withdrawal to the predetermined tension.

25 6. A belt tension indicator as claimed in claim 5, wherein the resilient connection includes two different rate springs, the first providing for the resilience to the predetermined tension and the second providing for the high rate resilience, further withdrawal.

30 7. A belt tension indicator as claimed in claim 2, wherein the resilient connection is adapted to allow the further withdrawal at least partially at a steady tension.

8. A belt tension indicator as claimed in claim 7, wherein the resilient connection includes a member arranged to deform plastically to provide the steady tension.

9. A tension indicator as claimed in any preceding claim, wherein the anchorage means is a clip.
10. A tension indicator as claimed in any one of claims 1 to 8, wherein the anchorage means is a length of strap
- 5 11. A tension indicator as claimed in any preceding claim, wherein the resilient means includes a shaft on which the strap is wound and resiliently urges the shaft in rotation to wind in the strap, at least when the strap is tensioned to the predetermined tension.
12. A belt tension indicator as claimed in claim 11 as appendant to claim 4, 6 or 8, wherein the spring or plastically deformable member is arranged within the shaft, 10 being fast with the shaft at one end and with the housing at the other end.
13. A belt tension indicator as claimed in claim 12, wherein a spring for indicating the predetermined tension (the first spring of claim 6) is arranged in series with the said spring or deformable member.
14. A belt tension indicator as claimed in claim 13, wherein the spring for indicating 15 the predetermined tension is arranged to become coil bound in the event of the predetermined tension being exceeded.
15. A belt tension indicator as claimed in any one of claims 11 to 14, wherein the indicator is a disc having indicating marks and arranged on the shaft with the indicating marks visible through a window in the housing according to the tension in 20 the strap.
16. A belt tension indicator as claimed in any one of claims 11 to 15, wherein the housing is of moulded plastics material, enclosing metallic members interconnecting anchorage means and the resilient connection.
17. A belt tension indicator as claimed in claim 7, wherein the resilient connection 25 includes:
 - a central, transverse pin, the anchorage means being connected to the transverse pin;
 - over-ridable stops adjacent the ends of the pins;
 - a U member having the strap connected to the central limb of the U and spiral windings at the ends of the distal limbs, the ends of the transverse pin being received in the spiral windings terminating in fingers, with the terminal fingers engaging the over-ridable stops for resilient withdrawal of the strap up to at 30 least the predetermined tension,

the arrangement being such that when the tension exceeds the predetermined tension, the terminal fingers over-ride the stops and windings un-wind with plastic deformation to provide the said limited deceleration.

18. A belt tension indicator as claimed in claim 17, wherein the indicating means is a

5 flag carried on the U member and visible through a window in the housing.

19. A belt tension indicator as claimed in claim 18, wherein the indicating flag is

crimped to the U member and able to slide along it when the tension exceeds the

predetermined tension.

20. A belt tension indicator as claimed in claim 17, claim 18 or claim 19, including

10 means to limit the unwinding of the spiral windings, to provide a complete connection

of the strap to the anchorage means in even of such unwinding.